

(PCT Article 36 and Rule 70)

Date of submission of the demand	Date of completion of this report
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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2004/011642

Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language _____, which is the language of a translation furnished for the purposes of:
- ☐ international search (Rule 12.3 and 23.1(b))
- ☐ publication of the international application (Rule 12.4)
- ☐ international preliminary examination (Rule 55.2 and/or 55.3)
2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:
- ☐ the international application as originally filed/furnished
- ☒ the description:
- pages 1-9 _____ as originally filed/furnished
- pages* _____ received by this Authority on _____
- pages* _____ received by this Authority on _____
- ☒ the claims:
- nos. _____ as originally filed/furnished
- nos.* _____ as amended (together with any statement) under Article 19
- nos.* 1-11 _____ received by this Authority on 01.04.2005 with letter of 30.03.2005
- nos.* _____ received by this Authority on _____
- ☐ the drawings:
- sheets _____ as originally filed/furnished
- sheets* _____ received by this Authority on _____
- sheets* _____ received by this Authority on _____
- ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages _____
- ☐ the claims, nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to sequence listing (*specify*): _____
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages _____
- ☐ the claims, nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2004/011642

Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement		
1. Statement			
Novelty (N)	Claims	<u>1-11</u>	YES
	Claims		NO
Inventive step (IS)	Claims	<u>1-11</u>	YES
	Claims		NO
Industrial applicability (IA)	Claims	<u>1-11</u>	YES
	Claims		NO
2. Citations and explanations (Rule 70.7)			
This report makes reference to the following documents:			
D1: YASUYUKI MATSUMURA ET AL.: "Synergic Effect of Nickel and Platinum Supported on Silicia in Catalytic Methanol Decomposition", CHEMICAL COMMUNICATIONS - CHEMCOM., 1997, XP002315664, GB ROYAL SOCIETY OF CHEMISTRY			
D2: A. J. RENOUPREZ ET AL.: "Catalytic Activity of Alumina Supported Platinum-Nickel Alloys", STUDIES IN SURFACE SCIENCE AND CATALYSIS, 1981, pages 173-185, XP008042149			
D3: EP-A-0 595 124 (BAYER AG), 4 May 1994 (1994-05-04)			
1. Novelty			
The present application meets the requirements of PCT Article 33(1) because the subject matter of claims 1-9, 10 and 11 is novel (PCT Article 33(2)).			
Claims 1-9 disclose a method for hydrogenating aromatic nitro compounds characterised in that a nickel-platinum alloy with an atomic ratio of nickel to platinum in the alloy ranging from 30:70 to 70:30 is used as a supported catalyst.			

Box No. V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement

Claim 10 claims the catalysts preferably used in the above method. They are characterised in that active carbon, soot or graphite are used as support. Claim 11 claims the use of these preferred catalysts for hydrogenating dinitrotoluene.

Document D1 (see D1, the entire document, in particular table 1 on page 657) describes nickel-platinum alloys with different nickel and platinum contents on a SiO₂ support, and their use as catalysts for decomposing methanol into carbon monoxide and hydrogen. D1 does not mention active carbon, soot or graphite as support materials, nor does it mention the hydrogenation of aromatic nitro compounds. The subject matter of claims 1-11 is therefore novel over D1.

Document D2 (see D2, pages 173-182) describes nickel-platinum alloys with different nickel and platinum contents on an aluminium oxide support, and their use as catalysts for the hydrogenolysis of neopentane. The subject matter of claims 1-11 is thus also novel over D2, since D2 does not mention active carbon, soot or graphite as support material, nor describes the hydrogenation of aromatic nitro compounds.

Document D3 describes a method for hydrogenating aromatic nitro compounds in the presence of a supported catalyst which contains platinum and nickel, but these two metals are not present in the catalyst as an alloy. The subject matter of claims 1-11 is therefore also novel over document D3.

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2. Inventive step

The present application further meets the requirements of PCT Article 33(1) because the subject matter of claims 1-11 involves an inventive step (PCT Article 33(3)).

In relation to document D3, which is considered to represent the closest prior art, claims 1-9 and 11 can be considered to address the problem of devising an improved method for hydrogenating aromatic nitro compounds. In order to solve this problem, the applicant proposes the method defined in claims 1-9, which differs from the method described in D3 in that a nickel-platinum alloy with an atomic ratio of nickel to platinum in the alloy ranging from 30:70 to 70:30 is used as a supported catalyst. In comparison with a catalyst in which nickel and platinum are present as discrete particles, rather than as an alloy, the catalyst according to the invention shows a surprisingly high selectivity, even at high temperatures. The method as per claims 1-9, and the use as per claim 11 of a nickel-platinum alloy as a supported catalyst for the hydrogenation of dinitrotoluene, are therefore considered inventive. Since the method as such is considered inventive, the catalysts as per claim 10, which are preferably used in this method, also involve an inventive step.

3. Industrial applicability

The subject matter of claims 1-11 is industrially applicable.